

**IN THE CLAIMS**

Please amend the claims as follows:

Claim 1 (currently amended): An outer tube comprising:

a body made of silicon carbide, configured to be used in a thermal treatment system and having an upper portion, a lower portion and a flange, wherein the upper portion is closed, the lower portion is open and is formed with a tapered portion expanding toward a lower end of the body, the flange is formed on an outer peripheral side of the tapered portion of the lower portion, and the following conditions are met:

- 1) a ratio of  $t_a/D_1$  is from 0.0067 to 0.025,
- 2) a product of  $t_a \times D_1$  is from 600 to 4,000 (mm<sup>2</sup>),
- 3)  $(D_{F2}-D_{F1}) \times t_c / (D_1 \times t_a)$  is from 0.1 to 0.7, and
- 4)  $L_1/L_2$  is from 1 to 10;

where the lower portion has a thickness of  $t_a$  (mm) and an inner diameter of  $D_1$  (mm), the flange has a thickness of  $t_c$  (mm), an inner diameter of  $D_{F1}$  (mm) and an outer diameter of  $D_{F2}$  (mm), and the tapered portion tapers such that the lower portion is expanded from the inner diameter  $D_1$  to the inner diameter  $D_{F1}$  over a height  $L_1$  (mm) and an expanse of  $L_2$  (mm).

Claim 2 (original): The outer tube according to Claim 1, wherein the tapered portion has upper and lower edges of an inner peripheral side rounded with a radius of 2 mm (R2) or above.

Claim 3 (original): The outer tube according to Claim 1, wherein the tapered portion has an inner surface having a surface roughness Ra of not greater than 7  $\mu$ m.

Claim 4 (currently amended): A thermal treatment system comprising:

an outer tube made of silicon carbide, wherein the outer tube has an upper portion, a lower portion and a flange, the upper portion is closed, the lower portion is open and is

formed with a tapered portion expanding toward a lower end of the outer tube, the flange is formed on an outer peripheral side of the tapered portion of the lower portion, the following conditions are met:

- 1) a ratio of  $t_a/D_1$  is from 0.0067 to 0.025,
- 2) a product of  $t_a \times D_1$  is from 600 to 4,000 (mm<sup>2</sup>),
- 3)  $(D_{F2} - D_{F1}) \times t_c / (D_1 \times t_a)$  is from 0.1 to 0.7, and
- 4)  $L_1/L_2$  is from 1 to 10;

where the lower portion has a thickness of  $t_a$  (mm) and an inner diameter of  $D_1$  (mm), the flange has a thickness of  $t_c$  (mm), an inner diameter of  $D_{F1}$  (mm) and an outer diameter of  $D_{F2}$  (mm), and the tapered portion tapers such that the lower portion is expanded from the inner diameter  $D_1$  to the inner diameter  $D_{F1}$  over a height  $L_1$  (mm) and an expanse of  $L_2$  (mm).

Claim 5 (original): The thermal treatment system according to Claim 4, wherein the tapered portion has upper and lower edges of an inner peripheral side rounded with a radius of 2 mm (R2) or above.

Claim 6 (original): The thermal treatment system according to Claim 4, wherein the tapered portion has an inner peripheral side having a surface roughness Ra of not greater than 7  $\mu$ m.

Claim 7 (original): The thermal treatment system according to Claim 4, wherein the height  $L_1$  of the tapered portion satisfies the relationship of  $H/4 < L_1 < 3 \cdot H/4$ , where a distance between a lowest end of a heater and a bottom surface of the outer tube is H (mm).

Claim 8 (currently amended): An outer tube for a thermal treatment system, comprising:

a body made of silicon carbide, configured to surround an inner tube of a thermal treatment system and having an upper portion, a lower portion and a flange, wherein the

upper portion is closed, the lower portion is open and is formed with a tapered portion expanding toward a lower end of the body, the flange is formed on an outer peripheral side of the tapered portion of the lower portion, a ratio of  $t_a/D_1$  is from 0.0067 to 0.025, a product of  $t_a \times D_1$  is from 600 to 4,000 ( $\text{mm}^2$ ),  $(D_{F2}-D_{F1}) \times t_c / (D_1 \times t_a)$  is from 0.1 to 0.7, and  $L_1/L_2$  is from 1 to 10, where the lower portion has a thickness of  $t_a$  (mm) and an inner diameter of  $D_1$  (mm), the flange has a thickness of  $t_c$  (mm), an inner diameter of  $D_{F1}$  (mm) and an outer diameter of  $D_{F2}$  (mm), and the tapered portion tapers such that the lower portion is expanded from the inner diameter  $D_1$  to the inner diameter  $D_{F1}$  over a height  $L_1$  (mm) and an expanse of  $L_2$  (mm).

Claim 9 (new): The outer tube according to Claim 1, wherein the  $L_1/L_2$  is from 2 to 8.

Claim 10 (new): The outer tube according to Claim 1, wherein the  $L_1/L_2$  is from 3 to

5.

Claim 11 (new): The thermal treatment system according to Claim 4, wherein the  $L_1/L_2$  is from 2 to 8.

Claim 12 (new): The thermal treatment system according to Claim 4, wherein the  $L_1/L_2$  is from 3 to 5.

Claim 13 (new): The outer tube according to Claim 8, wherein the  $L_1/L_2$  is from 2 to

8.

Claim 14 (new): The outer tube according to Claim 8, wherein the  $L_1/L_2$  is from 3 to

5.